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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 20031040	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/ES 03/00630	International filing date *(day/month/year)* 12.12.2003	Priority date *(day/month/year)* 20.12.2002

International Patent Classification (IPC) or both national classification and IPC

H04B7/005

Applicant

T.O.P. OPTIMIZED TECHNOLOGIES, S.L. et al.

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

I	☒	Basis of the opinion
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☐	Lack of unity of invention
V	☒	Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	☐	Certain documents cited
VII	☐	Certain defects in the international application
VIII	☐	Certain observations on the international application

Date of submission of the demand 13.07.2004	Date of completion of this report 05.01.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Lopez de Echazarreta Telephone No. +49 89 2399-6072

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. **PCT/ES 03/00630**

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):*

   Description, Pages

   1-29   as originally filed

   Claims, Numbers

   1-8   as originally filed

   Drawings, Sheets

   1/4-4/4   as originally filed

2. With regard to the **language,** all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: English   , which is:

   ☐   the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐   the language of publication of the international application (under Rule 48.3(b)).

   ☒   the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐   contained in the international application in written form.

   ☐   filed together with the international application in computer readable form.

   ☐   furnished subsequently to this Authority in written form.

   ☐   furnished subsequently to this Authority in computer readable form.

   ☐   The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐   The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐   the description,   pages:

   ☐   the claims,   Nos.:

   ☐   the drawings,   sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-8
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-8
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-8
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V
Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement
Reference is made to the following documents:

D1: CHANG ET AL: 'Novel power control scheme for multimedia CDMA transmission' ENABLING TECHNOLOGIES FOR 3G AND BEYOND vol. 4529, November 2001, pages 57 - 68

D2: US-B1-6 219 342

D3: KANDUKURI ET AL: 'Optimal power-control in interference-limited fading wireless channels with outage-probability specifications' IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS vol. 1, no. 1, January 2002, pages 46- 55

D4: ZORZI M: 'Power control and diversity in mobile radio cellular systems in the presence of ricean fading and log-normal shadowing' IEEE TRANS. ON VEHICULAR TECHNOLOGY vol. 45, no. 2, May 1996, pages 373 - 382

D5: ZHANG Q T: 'Outage probability of cellular mobile radio in the presence of multiple nakagami interferers with arbitrary fading parameters' IEEE TRANS. ON VEHICULAR TECHNOLOGY vol. 44, no. 3, August 1995, pages 661 - 667

1. The application relates to a method and apparatus for outer loop power control (claims 1 and 6).

2. Document D1, which is considered to represent the most relevant state of the art, discloses a power control scheme for downlink CDMA by using an outage probability criterion.

   The power is assigned to each link of the system so that the overall outage probability is minimized subject to three constraints. They are the total transmission power at the base station, the maximum transmission power for each user, and the maximum tolerable outage probability for each user. The Newton-Raphson algorithm is modified to solve the minimization problem under these constraints.

3. Claim 1 also discloses a power control scheme for outer loop using the outage probability and the Newton-Raphson algorithm but in a completely different method. The proposed method comprises the following steps :
   - estimation of the desired SIR of the received signal.
   - estimation of diverse statistical moments of the desired SIR.
   - based on these statistical moments and on a specification of the outage probability,

- calculation of the margin of the desired SIR
and
- based on the aforementioned margin, obtention of the desired SIR_{target} for the outer loop .

4.   The objective of the power control scheme disclosed in claim 1 is not to minimize the overall outage probability subject to some constraints but to obtain a margin (and based on it the desired SIR_{target}) that fulfils the desired outage probability, which in this case also defines the Quality of Service of the link.

The subject-matter of claim 1 provides a mathematically rigorous method for maintaining the Quality of Service of a specific link that can also respond to constant statistical variations of the radioelectric channel.

5   None of the documents cited in the International Search Report discloses the subject-matter of claims 1 or 6 or renders it obvious.

D2 discloses a reverse outer loop power control which is based on a method to control FER in a variety of environments and at the same time keeps the performance benefits of a fixed symbol error rate technique.

D3 discloses the problem of allocating power in a wireless system taking into account the statistical fluctuation in SIR induced by Rayleigh fading. The problem of minimizing probability of outage is for all practical porpuses solved by maximizing the CEM (Certainty-Equivalent Margin), which can be done using Perron-Frobenius eigenvalue method.

D4 Discloses how can the performance of a cellular mobile radio system with frequency reuse be evaluated in terms of outage probability.

D5 discloses a technique to determine the probability of outage in presence of Multiple Nakagami Interferers.

6   Claims 2-5 and 7-8 are dependent on claims 1 and 6 respectively and as such also meet the requirements of the PCT with respect to novelty (Art. 33(2) PCT) and inventive step (Art. 33(3) PCT).